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EXAMINER	
OSBORNE, LUKE R	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/800,489	Applicant(s) ZHANG ET AL.	
	Examiner LUKE OSBORNE	Art Unit 2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Status

1. Claims 1-15 are pending in the instant application.

Claims 1-15 stand rejected.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 1-15 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

To be statutory, a claimed computer-related process must either:

(A) result in a physical transformation outside the computer for which a practical application is either disclosed in the specification or would have been known to a skilled artisan, or

(B) be limited to a practical application, by being tied to another statutory category of invention and having a useful, concrete, and tangible result.

The term "practical application" means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are to the extent

permitted by law or Government regulations available to the public on reasonable terms [35 USC 201 (f)].

Claim 1 as exemplary of claims 1 and 10 do not recite a physical transformation outside of a computer. What is determinative for a method claim is not how the computer performs the process, but what the computer does to achieve a practical application.

A process claim needs to be tied to another category of invention and limited to a practical application when the method, as claimed, produces a concrete, tangible and useful result; i.e., the method recites a step or act of producing something that is concrete, tangible and useful.

Claim 1, as exemplary of claims 1 and 10, recites an abstract idea consisting merely of a mathematical algorithm. This algorithm is not tied to another statutory category of invention nor does it produce a statutory result.

Any claim not directly rejected on 35 U.S.C 101 stands rejected due to its dependency.

To expedite a complete examination of the instant application, the claims rejected under 35 U.S.C 101(nonstatutory) above are further rejected as set forth below in anticipation of applicant amending these claims to place them within the four statutory categories of invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1-15 are rejected under 35 U.S.C. 102(a) as being anticipated by Applying data mining in investigating money laundering crimes by Zhang et al., hereinafter "Zhang".

Regarding claim 1 Zhang discloses a method for automatic community model generation based on uni-parity data, comprising the steps of: hypothesizing a subset S of set U, wherein for any pair of items in said subset S there exists a mathematical function C applicable to said pair of items so as to generate a correlation value and correlation relationship between any said pair of items in subset S; generating said correlation values by applying said function C to each of said pairs of items in said subset S; graphing G(S,E), wherein E is the edge set of said graph G with computed correlation values as weights; and mapping said graph g to one of its subgraphs MG so as to generate a community

> [Zhang: Figure 2 shows the components of LDCA as well as the data flow of these components. In principle, LDCA consists of three basic steps. For each problem in the uni-party data community generation paradigm, assume that the data item set is U. Link Hypothesis hypothesizes a subset S of U, such that for any pair of the items in S there exists a mathematical function (or a procedural algorithm) C that applies to this pair of items to generate a correlation value in the range of [0, 1], i.e., this step defines the correlation relationship between any pair of items in S:]∀ . Link Generation is then concerned with applying the function C to every pair of the items in S to actually generate the correlation values. This results in a complete graph G(S,E) where E is the edge set with the computed correlation values. Finally, Link Identification defines another function P that maps the complete graph G to one of its subgraph M⊆ G as a generated

community. In the next section, we present a specific method of LDCA in the application of MLC group model generation. (Page 749, left column, first full paragraph)].

Regarding claim 2 Zhang discloses the method of claim 1, wherein said correlation relationship and said correlation value is defined by: .A-inverted.p,q.epsilon.SU,C:S.times.S.f- wdarw.[0,1]and wherein said correlation value is in the range of [0,1] [Zhang: Page 749, left column, first full paragraph].

Regarding claim 3 Zhang discloses a method for solving a community generation problem, comprising the steps of: converting documents to digital form and tagging said digitized documents; parsing said digitized and tagged documents to extract the transaction history vector for each individual; [Zhang: In this project, we have a data set consisting of 7,668 free text, physical documents regarding a real MLC case provided by the National Institute of Justice (NIJ). The documents are first converted to a digital format using an OCR, and then key entities are tagged using a commercial IE tool. The tagged (Page 748, right column, 4th column)]

creating timelines of said transaction vectors so as to form a timeline map; determining the relevancy of said vectors; [Zhang: The specific method we have developed in solving for the automatic MLC group model generation problem is based on the general LDCA methodology applied in the MLC investigation context along the financial transaction timeline (Page 749, Section 5, first paragraph, Section 5.1)]

projecting said vectors along a time dimension so as to form a histogram; translating said vectors into groups of activities by histogram clustering; determining the

local correlation between any pair of clusters in the timeline of two individuals; computing the global correlations between pairs of individuals; [Zhang: (3) the correlation between two individuals is defined through a correlation function between the two corresponding financial transaction history vectors; (page 749, Section 5.1)]

converting data to a graph as a function of all individuals extracted from said documents and the correlation values between said individuals; generating models based on a search of all subgraphs with correlation values above a threshold [Zhang: page 750, Section 5.3]; and

outputting a group model [Zhang: For the problem of MLC group model generation, (page 751, Section 5.4, Link Identification)].

Regarding claim 4 Zhang discloses the method of claim 3, wherein said step of parsing further comprises the step of applying the "one way nearest neighbor" principle [Zhang: While the above “one way nearest neighbor” parsing principle may not be necessarily true in all the circumstances, we propose this principle based on the following two reasons: (Page 749, Section 5.1, 4^{th} paragraph)].

Regarding claim 5 Zhang discloses the method of claim 4, wherein said "one way nearest neighbor" principle further comprises the following steps as applied to a money laundering problem: for every person's name encountered, the first immediate time instance is the first time instance for a series of financial activities; the second immediate time instance is the second time instance for another series of financial

activities, etc.; for every time instance encountered, all the subsequent financial activities are considered as the series of financial activities between this time instance and the next time instance; financial activities are identified in terms of money amount; money amount is neutral in terms of deposit or withdrawal; each person's time sequence of financial activities is updated if new financial activities of this person are encountered in other places of the same document or in other documents; and the financial activities of each time instance of a person is updated if new financial activities of this time instance of the same person are encountered in other places of the same document or in other documents

> [Zhang: Since we only have access to the isolated, tagged entities in the documents, we must make an assumption to reasonably “guess” the associated relationships between the extracted time/date stamps and the money amount of a specific transaction with the extracted individual. Therefore, when we parse the collection of documents to extract the financial transaction history vector for every individual, we follow the proposed one way nearest neighbor principle: (1) for every person name encountered, the first immediate time instance is the first time instance for a series of financial activities; the second immediate time instance is the second time instance for another series of financial activities, etc.; (2) for every time instance encountered, all the subsequent financial activities are considered as the series of financial activities between this time instance and the next time instance; (3) financial activities are identified in terms of money amount; money amount is neutral in terms of deposit or withdrawal; (4) each person’s time sequence of financial activities is updated if new financial activities of this person are encountered in other places of the same document or in other documents; and (5) the financial activities of each time instance of a person is updated similarly. (page 749, Section 5.1, 2nd paragraph,)]

Regarding claim 6 Zhang discloses the method of claim 3, wherein said step of determining the relevancy of said vectors further comprises a step of focusing on "clusters" of vectors in said timeline map and ignoring scattered (i.e., non-clustered) vectors in said timeline map [Zhang: page 750, Section 5.2 Clustering Algorithm].

Regarding claim 7 Zhang discloses the method of claim 3, wherein said step of translating said vectors into groups of activities further comprises solving a standard histogram clustering problem; and simplifying said standard clustering problem by virtue of all individuals sharing the same said timeline

> [Zhang: Assume that there are n individuals extracted in total. This clustering problem is then a standard clustering problem in an n+2 dimensional Euclidean space (n PERSON dimensions, 1 TIME dimension, and 1 TRANSACTION dimension). This problem may be solved through applying the standard K-means algorithm. However, taking advantage of the fact that all the n individuals share the same timeline, we can further simplify this general n+2 dimensional clustering problem as follows. (Page 750, Section 5.2, 2nd paragraph)].

Regarding claim 8 Zhang discloses the method of claim 3, wherein said step of computing correlations between pairs of individuals further comprises computing the global correlation of all local correlations between pairs of individuals

> [Zhang: After the clustering, each individual's financial transaction history vector may be represented as a timeline histogram partitioned into K clusters, which may in turn be represented as K histogram functions of time t: <fi(t)>, where fi(t) is the financial transaction histogram of this individual in cluster i. Hence, the correlation between two individuals <x,y> is defined as a combined global correlation of all the local correlations between the two individuals, where the local correlation is defined as the correlation between two clusters of the timeline histograms of the two individuals. (Page 750, Section 5.3, first paragraph)].

Regarding claim 9 Zhang discloses the method of claim 8, further comprising the step of computing local correlations by computing the correlation between two clusters corresponding to a pair of individuals on said histograms

> [Zhang: After the clustering, each individual's financial transaction history vector may be represented as a timeline histogram partitioned into K clusters, which may in turn be represented as K histogram functions of time t: <fi(t)>, where fi(t) is the financial transaction histogram of this individual in cluster i. Hence, the correlation between two individuals <x,y> is defined as a combined global correlation of all the local correlations between the two individuals, where the local correlation is defined as the correlation between two clusters of the timeline histograms of the two individuals. (Page 750, Section 5.3, first paragraph)].

Regarding claim 10 Zhang discloses the method of claim 9, wherein said step of computing correlations between two clusters further comprises the step of computing the fuzzified correlation between fx.sub.i(t) and fy.sub.j(t), the financial transaction histogram functions of individual x and y in cluster i and j, respectively.

> [Zhang: While the local correlation is defined following a standard approach in Pattern Recognition literature to determining a fuzzified "similarity" between two functions [9], the global correlation is defined based on the unique nature of this problem to further constrain the overall "similarity" between the financial transaction patterns along the timeline of two individuals. (page 750, Section 5.3, first paragraph)]

Regarding claim 11 Zhang discloses the method of claim 10, wherein said step of computing the fuzzified correlation between fx.sub.i(t) and fy.sub.j(t) further comprises the step of computing the maximum correlation value 6 g (x i y j) = max t = 0 W i t ' = - W j W j gx i (t ') gy j (t - t ') where gx i (t) = t ' = 1 W i fx i (t ') G i (t , t ') where G i (a , b) = 1 2 i e - (a - b) 2 2 i 2 and where i = 2 W i (W i - 1) a = 1 W i b = a + 1 W i a – b.

[Zhang: Page 751, Section 5.3.1, Local Correlation]

Regarding claim 12 Zhang discloses the method of claim 8 wherein said step of computing the global correlation of all local correlations between pairs of individuals further comprises computing the dot product between two vectors as follows: 7 C (x , y) = Cy (x) Cx (y) = i = 1 K C (x i , y) C (y i , x) where the vectors Cy(x) and Cx(y) are defined as Cy(x)=<C(x.sub.i,y), i=1, . . . , K>Cx(y)=<C(y.sub.i,x), i=1, . . . , K>where C(x.sub.i,y)=max.sub.j=1.sup.K=[g(x.sub.i,y.sub.j)S(i,j)] 8 S (i , j) = e - (c i - c j) 2 2 i 2 and where [g(x.sub.i,y.sub.j)S(i,j), j=1, . . . , K]

[Zhang: Page 751, Section 5.3.1, Global Correlation]

Regarding claim 13 Zhang discloses the method of claim 3, wherein said step of converting data to a graph further comprises obtaining a complete graph G(V, E), where V is the set of all the individuals extracted from the given collection of the documents, and E is the set of all the correlation values between individuals such that for any correlation C(x, y), there is a corresponding edge in G with the weight C between the two nodes x and y.

[Zhang: After applying the correlation function to each pair of individuals in the data set U, we obtain a complete graph G(V, E), where V is the set of all the individuals extracted from the given collection of the documents, and E is the set of all the correlation values between individuals such that for any correlation C(x, y), there is a corresponding edge in G with the weight C between the two nodes x and y. (Page 751, Section 5.4, first paragraph)]

Regarding claim 14 Zhang discloses the method of claim 3, wherein said step of generating models further comprises the step of identifying links as a graph segmentation based on a minimum correlation threshold value

[Zhang: For the problem of MLC group model generation, we define the function P in Link Identification as a graph segmentation based on a minimum correlation threshold T. The specific value of T may be obtained based on a law enforcement investigator's expertise, which also allows the investigator to play with different thresholds to be able to validate different models generated based on his/her expertise. (Page 751, Section 5.4, Paragraph 2)].

Regarding claim 15 Zhang discloses the method of claim 14, wherein said minimum threshold value is selected based upon a user's expertise

[Zhang: For the problem of MLC group model generation, we define the function P in Link Identification as a graph segmentation based on a minimum correlation threshold T. The specific value of T may be obtained based on a law enforcement investigator's expertise, which also allows the investigator to play with different thresholds to be able to validate different models generated based on his/her expertise. (Page 751, Section 5.4, Paragraph 2)].

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUKE OSBORNE whose telephone number is (571)272-4027. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul L. Rodriguez can be reached on (571) 272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Luke Osborne/
Examiner, Art Unit 2123

/Paul L Rodriguez/
Supervisory Patent Examiner,
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